

## CLAIMS

[1] A direct alcohol fuel cell comprising an anode having an anode catalyst layer, a cathode having a cathode catalyst layer, and a solid polymer electrolyte membrane arranged between the anode and cathode, the direct alcohol fuel cell generating electricity by supplying the anode with alcohol and water;

wherein the cathode catalyst layer contains a metal complex and/or a metal complex fired product formed by firing the metal complex as a catalyst.

[2] A direct alcohol fuel cell according to claim 1, wherein the metal complex has a porphyrin ring or phthalocyanine ring.

[3] A direct alcohol fuel cell according to claim 2, wherein the metal complex includes at least one species of metal selected from the group consisting of Co, Fe, Ni, Cu, Mn, and V as a center metal.

[4] A direct alcohol fuel cell according to one of claims 1 to 3, wherein the catalyst includes a carrier catalyst having a carbon material carrying the metal complex and/or the metal complex fired product.

[5] A direct alcohol fuel cell according to claim 4, wherein the carrier catalyst is formed by firing the metal complex in a state carried by the carbon material.

[6] A direct alcohol fuel cell according to one of claims 1 to 5, wherein the solid polymer electrolyte is an anion exchange membrane.

[7] A direct alcohol fuel cell comprising an anode having an anode catalyst layer, a cathode having a cathode catalyst layer, and a solid polymer electrolyte membrane arranged between the anode and cathode, the direct alcohol fuel cell generating electricity by supplying the anode

with alcohol and water;

wherein the solid polymer electrolyte membrane is an anion exchange membrane; and

wherein the cathode catalyst layer contains silver as a catalyst.

5 [8] A direct alcohol fuel cell according to claim 7, wherein the catalyst includes a carrier catalyst having a carbon material carrying the silver.

10 [9] A direct alcohol fuel cell according to one of claims 6 to 8, wherein the anion exchange membrane is constituted by a polymer compound having a cation group within a molecule.

[10] A direct alcohol fuel cell according to claim 9, wherein the cation group is at least one species selected from the group consisting of pyridinium, alkylammonium, and imidazolium groups.

15 [11] A direct alcohol fuel cell according to one of claims 6 to 10, wherein the cathode catalyst layer contains an anion exchange resin as a binder.

[12] A direct alcohol fuel cell according to one of claims 1 to 11, wherein the alcohol is at least one species selected from the group consisting of methanol, ethanol, ethylene glycol, glycerin, and erythritol.

20 [13] A method of manufacturing a direct alcohol fuel cell comprising an anode having an anode catalyst layer, a cathode having a cathode catalyst layer, and a solid polymer electrolyte membrane arranged between the anode and cathode, the direct alcohol fuel cell generating electricity by supplying the anode with alcohol and water;

25 the method comprising the steps of:

forming the cathode catalyst layer by using a metal complex

and/or a metal complex fired product formed by firing the metal complex; and

forming the solid polymer electrolyte membrane by plasma polymerization.

5 [14] A method of manufacturing a direct alcohol fuel cell comprising an anode having an anode catalyst layer, a cathode having a cathode catalyst layer, and a solid polymer electrolyte membrane arranged between the anode and cathode, the direct alcohol fuel cell generating electricity by supplying the anode with alcohol and water;

10 the method comprising the steps of:

forming the cathode catalyst layer by using silver; and

forming an anion exchange membrane by plasma polymerization, so as to yield the solid polymer electrolyte membrane constituted by the anion exchange membrane.